This author-produced PDF is the accepted version, prior to copyediting, of Corvino, F. (2025). Luxury-focused climate mitigation policies: A comparative ethical analysis. *PLOS Climate* 4(11): e0000740. The Version of Record is available online at: https://doi.org/10.1371/journal.pclm.0000740 . Use of this accepted version is subject to the publisher's terms of use for accepted manuscripts.

Luxury-focused climate mitigation policies: A comparative ethical analysis

Fausto Corvino[1]

Abstract

This article focuses on the climate change policies that are needed to reduce the greenhouse gas emissions of the ultra-rich, primarily from superyachts, private jets, mega-mansions, and high-emission road vehicles. These are all goods for which demand is inelastic and therefore difficult to curb with Pigouvian policies. The article proposes a comparative analysis of the three main luxury-focused mitigation policies discussed in the literature: bans, luxury carbon taxation and progressive carbon taxation. The analysis is based on six normative and non-normative criteria: emissions justice, expressive justice, social efficiency, the non-frustration of legitimate expectations, administrative feasibility and prevention of carbon leakage. The first part of the article discusses how each of these criteria is relevant to an analysis of mitigation policies targeting the emissions of the ultra-rich. The second part examines each luxury-focused mitigation policy against all six criteria and assigns them a score. The third section briefly discusses the results of this comparative analysis.

Introduction

Various ethical arguments have been put forward for why we should strongly discourage greenhouse gas emissions from luxury and emission-intensive goods such as private jets, superyachts, mega-mansions and high-emission road vehicles [1–7]. We can refer to these as high-end goods, and define the emissions generated by high-end goods as high-wealth emissions. There is a general convergence in the literature that, to effectively curb high-wealth emissions, we need to go beyond Pigouvian policies. This is because high-end goods are mainly consumed by the ultra-rich, i.e. (US dollar) multimillionaires, whose price elasticity is significantly lower than that of everyone else [8,3].

The three main alternative policy instruments to mitigate high-wealth emissions are bans, luxury carbon taxation and progressive carbon taxation. Bans mean the prohibition of buying and/or owning high-end goods after a certain date [9,4]. Luxury carbon taxation refers to imposing a surcharge on the purchase and/or ownership of high-end goods, e.g. as a percentage of the list price [1,7,6,10]. Progressive carbon taxation consists of introducing different marginal tax rates for carbon emissions, which increase depending on how much an individual emits over a certain period – for example, over the course of a year [3,11,12]. I will refer to the three different policy options as luxury-focused mitigation policies. These are usually seen as a necessary complement to climate policies that provide a significant incentive to reduce emissions for

[1] Hoover Chair in Economic and Social Ethics & Institut supérieur de philosophie (ISP), Université catholique de Louvain, Louvain-la-Neuve, Belgium, fausto.corvino@uclouvain.be .

everyone who is not ultra-rich – in short, equal-for-all mitigation policies. Some examples of such policies are a flat carbon price, a cap-and-trade system with auctioned allowances, etc.

Many of the advocates of luxury-focused mitigation policies have not made a strong case for any particular one. Rather, they have tended to focus on a single policy instrument, mainly for the sake of simplicity in arguing against high-wealth emissions, while recognising that, at least in certain cases, there may be reasons to use another policy instrument [1,3,4]. This article aims to fill this gap in the literature on the ethics of climate policy. It provides a comparative analysis of luxury-focused mitigation policies based on six criteria: emissions justice, expressive justice, social efficiency, the non-frustration of legitimate expectations, administrative feasibility, and the prevention of carbon leakage. The first four of these criteria are normative. These indicate the desirable states of affairs to which policies should aspire, based on ethical principles and values. The last two criteria are non-normative. These indicate the characteristics policies must possess to have a good chance of achieving the desired states of affairs given existing economic, institutional, and political constraints.

Methodologically, the article will adopt a "constructive" approach to ethics and public policy [13–15]. Assuming that different people will have different reasonable moral intuitions about the relative importance of the above criteria, all criteria will be treated as equally relevant. Each policy option will be assigned a low, medium or high score with respect to each criterion. The fact that a policy option scores low on one criterion is not in itself a reason to abandon the policy. The data must be contextualised within an overall analysis. More specifically, a policy option that scores low on both a normative and non-normative criterion can be considered less desirable overall than a policy option that scores high on the same two criteria, all other things being equal. However, the article does not indicate how to resolve trade-offs that arise when one policy option scores high on a normative criterion and low on a non-normative criterion and another policy option scores low on the same normative criterion and high on the same non-normative criterion. The article is only intended to define the normative and non-normative attributes of a "menu" of luxury-focused mitigation policies [13]. This could be useful for policymakers when deciding which policies to implement based on broader political considerations and for the public when evaluating policymakers' actions or inactions with respect to high-wealth emissions. Those who disagree with this constructive methodology can still adopt the descriptive part of the analysis if they find it convincing, incorporating it into a comparative scheme in which they assign different weights to different criteria based on their preferred normative theories.

1. The criteria for policy evaluation

In this section I will give a brief overview of the criteria I will use to compare luxury-focused mitigation policies. In the next section, I will evaluate each policy option according to how well it meets each criterion. Finally, I will briefly discuss the results of this comparative analysis.

1.1 Just emissions

Climate change is associated with a series of risk thresholds, with increasingly severe and potentially irreversible consequences becoming inevitable once they are exceeded. These are usually presented as thresholds of global warming above pre-industrial levels, for example 1.5°C, 2°C, etc. Different people often have different views, based on ethical, economic and scientific arguments, about the level of risk that is justified in imposing on both present and future generations. However, each chosen risk threshold comes with a limited emissions budget that is probabilistically compatible with it [16]. This means that unless one believes that climate

change should continue unchecked, collective emissions must be capped at some point. This raises the normative question of how to allocate the collective carbon budget fairly, i.e. who should have access to it, to what extent and for what reasons. Clearly, the stricter the desired risk threshold, the smaller the collective carbon budget, and the fewer emissions will be compatible with it after accounting for those needed to meet people's basic needs [17]. If the ultra-rich face the same price constraints on emissions-generating actions as everyone else, they will use up a disproportionate share of the carbon budget. This remains true whether the collective carbon budget is managed with a flat carbon price or opened up to emissions trading after being divided according to a patterned principle or being auctioned. Three arguments can be used to justify luxury-focused mitigation policies insofar as they prevent the collective carbon budget from being consumed by high-wealth emissions rather than other emissions, whether subsistence-related or not.

The first is the wasteful emissions argument. High-wealth emissions primarily result from frivolous consumption which does not decisively contribute to human flourishing for those who engage in it. This is because the actions that generate these emissions can be substituted with less polluting alternatives without individuals losing their reasonable chance of experiencing a condition in which "all aspects of [their lives] are good" [18]. In short, the ultra-rich could live a luxurious and ostentatious life by making use of the wide range of low-carbon alternatives to the high-end goods analysed in this article. This distinguishes high-wealth emissions not only from subsistence emissions, but also from emissions that enable people to do things essential to living the life they want, such as pursuing personal fulfilment, developing talents and skills, etc. At the same time, high-wealth emissions significantly erode the carbon budget. A smaller budget increases the general cost of accessing it due to the law of supply and demand. In practice, the smaller the carbon budget, the higher the flat carbon price must be to remain consistent with it. Similarly, in a cap-and-trade system, if the supply of emissions allowances decreases but demand remains constant, the market price will inevitably rise. Consequently, the cost of emissions will increase for those who rely on them to carry out actions crucial to their own flourishing. Luxury-focused mitigation policies would be morally desirable because, by limiting high-wealth emissions, they enable more people to do good in key areas of life while staying within the collective carbon budget [4].

The second is the "real" sacrifice argument. Living within a collective carbon budget has social implications. Either individuals must pay for their emissions, or they must stop emitting, which obviously entails behavioural change. If the government has to impose costs on individuals to mitigate the risk of a "common disaster", such as climate change, then it could be argued that there is no valid reason why some should bear the "real" costs while others should not. "Real" costs refer to a reduction in individual welfare rather than a simple decrease in wealth [19–21]. Equal-for-all mitigation measures would encourage most people to change their consumption behaviour to protect their income. For many, this would result in significant setbacks to their welfare; for example, they might have to stop travelling, stop buying things they want, move to a smaller house, or have fewer children. However, equal-for-all mitigation policies would not prevent multimillionaires from continuing to own and use private jets, superyachts and mega-mansions, etc. [21]. Of course, policies such as a flat carbon price would impose monetary costs on multimillionaires. Yet, due to their level of wealth, the monetary costs incurred by these individuals as a result of equal-for-all mitigation policies would translate into small or insignificant real costs [20]. Luxury-focused mitigation policies would partially reverse this. They would impose greater real costs on the ultra-rich by forcing them to change their lifestyles. This

would also reduce demand on the carbon budget, thus lowering the overall cost of accessing it and alleviating the burden of mitigation on the most vulnerable.

The third is the unjust entitlement argument. It has recently been suggested that multimillionaires do not have a moral right to a portion of their wealth, even though it is legally theirs [3]. This would be the case given current levels of inequality within countries, and based on any reasonable theory of socio-economic justice — including libertarian ones, which tend to be more tolerant of extreme wealth. Many multimillionaires spend the unjust portion of their wealth on high-end goods. The emissions produced by these goods erode the collective carbon budget and contribute to climate threats, which disproportionately affect the poorest. All of this "add[s] insult to injury" [3]. Luxury-focused mitigation policies would prevent the ultra-rich from using the carbon budget in a way that compounds background distributive injustice [22].

1.2 Expressive justice

Extreme wealth can lead to expressive wrongdoing if it is spent on frivolous consumption that shows total indifference, or even contempt, towards those with much more pressing claims to scarce societal resources [23]. This kind of wrongdoing exacerbates any distributive injustice that fuels inequalities in consumption. Those who engage in extreme forms of frivolous consumption are, more or less voluntarily, conveying the following message to victims of distributive injustice: "I could easily mitigate existing injustices in resource and/or welfare distribution by giving up a small part of my wealth and ensuring you have enough, but instead I choose to spend my money as extravagantly as possible". The argument that retaining or spending extreme wealth creates a problem of interpersonal morality because it is "preposterous" has recently been defined as the "excess intuition" [23]. From the perspective of expressive wrongdoing, one could argue that there is no substantial difference between retaining extreme wealth in the face of others' urgent needs and spending it frivolously. However, I posit that when extremely frivolous consumption is also conspicuous — for example, owning a mega-mansion or sailing a luxury superyacht around the world — the expressive wrongdoing becomes more serious because it is made apparent to everyone. Expressive wrongdoing is an interpersonal issue. However, it takes on a political dimension when the government allows it to happen without taking action to prevent it, despite being able to do so easily. By failing to act, the government implicitly legitimises the disregard that the ultra-rich show towards everyone else. This elevates the issue to an institutional level, rendering it a matter of justice [23].

The excess intuition has originally been presented in relation to the distribution and use of wealth. However, it is also applicable to emission shares. Indeed, the excess intuition suggests that there is not only a quantitative difference, but also a qualitative difference, between using emission shares from the collective carbon budget to upgrade from a one-bedroom to a two-bedroom house, and using emission shares to upgrade from a 24-metre yacht to a 40-metre superyacht. The move to a two-bedroom house reflects socially recognised individual preferences [23], such as providing a child with their own space, which is valued by the vast majority and significantly impacts a family's quality of life. Conversely, upgrading from a yacht to a superyacht is about satisfying frivolous preferences that most people cannot comprehend. Both purchases could be considered unfair uses of the collective carbon budget, albeit to different degrees. This would be the case, for example, if the collective carbon budget were so limited that a dramatic choice had to be made between allowing someone's subsistence emissions or overshooting the probabilistically compatible mitigation target, thereby causing avoidable and dramatic damage to people and nature [24,17]. However, it could be argued that there is a deeper moral issue with purchasing a superyacht, one that extends beyond the mere

violation of the fair allocation of emission shares. By choosing to buy a superyacht, a person demonstrates a complete lack of concern for the climate crisis facing society. They prioritise their own trivial and extravagant desires over preventing climate change and ensuring that others can live decently. In doing so, they position themselves as morally superior to everyone else. This is simply incompatible with the deeply rooted liberal idea of moral equality [25]. The government demonstrate its disapproval of high-wealth emissions by introducing luxury-focused mitigation policies, thus avoiding becoming complicit in the expressive wrongs they entail [26].

1.3 Social efficiency

High-end goods are positional. They are pursued mainly because of how they compare with other people's goods, rather than because of their intrinsic qualities [27–30]. In general, the more people around a multimillionaire who have bigger and/or more luxurious houses, yachts, jets and cars than they do, the more inadequate their own possessions will appear to them. Consequently, the greater the social pressure on the multimillionaire to seek more conspicuous items.

It has been argued that a great deal of social resources are wasted when the ultra-rich engage in positional consumption [30,31]. While the relative positions of multimillionaires remain unchanged, total spending increases exponentially. Even worse, competition for high-end goods triggers "expenditure cascades" [31]. As the ultra-rich compete to own the most luxurious items, they gradually raise the bar for what constitutes appropriate consumption for those immediately below them in the social scale — that is, the rich. The rich, in turn, raise it for the upper middle class, and so on down the social scale until a certain point is reached. One consequence of this is that some people may be forced to choose between increasing their positional consumption to keep up with others — for example, by reducing spending on non-positional consumption, such as security, healthcare, etc. — or losing their social position.

There are two arguments for the view that luxury-focused mitigation policies would promote social efficiency. One argument is that preventing multimillionaires from purchasing high-end goods would encourage more efficient use of money by everyone. In the aggregate, people would spend less money on social markers and their relative positions would not change significantly [1,2]. A second, narrower argument is that preventing multimillionaires from producing high-wealth emissions would encourage a more efficient use of the collective carbon budget. Indeed, the production of high-end goods generates emissions that erode the carbon budget, and expenditure cascades caused by these goods lead to still more emissions that erode the budget even further. By interrupting this snowballing effect, luxury-focused mitigation policies could preserve large portions of the collective carbon budget without anyone experiencing significant setbacks in their positional status [4]. This article will assess how different luxury-focused mitigation policies can achieve these two interrelated goals.

1.4 The non-frustration of legitimate expectations

Every transition policy involves some deviation from the status quo. This deviation is typically justified by the desirability of the final state that the transition aims to achieve (e.g. a low-carbon economy). However, it may also cause a setback to the welfare of individuals who have made long-term plans (e.g. relating to work, family, etc.) based on the expectation that the status quo would remain more or less unchanged. Generally, when implementing a transition policy, a government has a duty to consider these implications [32,33]. This is because the ability to make long-term plans is essential for leading an autonomous and flourishing life. A government that frustrates someone's long-term plans without valid reason commits a morally questionable

act [34]. However, not all of the claims that stakeholders may raise against a transition policy are equally relevant. Some stakeholders' expectations are legitimate and may therefore exert normative leverage over the policy, while others are not. For a stakeholder's expectations to be considered legitimate, they must fulfil both epistemic and justice-based requirements [33]. If one or more stakeholders have legitimate grounds for opposing the adoption of a transition policy, the government must consider abandoning at least part of the desired deviation from the status quo. For instance, they could implement a less ambitious transition policy than initially proposed. Alternatively, they could proceed with the desired deviation from the status quo and mitigate the resulting frustration among stakeholders by providing some form of compensation [35,33]. Accordingly, different policy options can be evaluated based on the extent to which they frustrate the legitimate expectations of stakeholders, and on whether they can create resources to compensate for such frustration. To illustrate this, we can consider how it applies to luxury-focused mitigation policies.

Luxury-focused mitigation policies could lead to a collapse in the production of high-end goods. This could frustrate the expectations of those who have planned their lives around the assumption that luxury production would continue unimpeded by government interference. For the sake of argument, we can focus exclusively on the luxury industry, bearing in mind that these considerations can be extended to part of the supply chain. We can distinguish three main categories of actors: investors, workers, and consumers. It can be said that all of these actors have formed the epistemically reasonable expectation that the production of high-end goods will not be severely impeded by governments. In fact, multimillionaires are generally taxed less than other people, which is why their wealth and numbers have grown in recent decades. One reason for this is that they generate most of their income from capital investments, which are usually taxed less than income from labour [36]. Furthermore, some high-end goods are taxed at a lower rate than ordinary goods. For instance, private jet flights are taxed less than scheduled flights in both the US and the EU [37]. In some countries, fuel for superyachts is also taxed at a lower rate than fuel for smaller boats [38–41]. The bottom line is this: Governments have permitted the consumption of high-end goods to grow disproportionately without attempting to control it [10].

For an epistemically valid expectation to be considered legitimate, however, certain justice-related criteria must be met. One of these is the criterion of consistency [33]. If someone has an epistemically valid expectation that they can continue to do X and a valid moral conviction that society should do Y, the expectation to do X is only legitimate if others in similar situations can also do X without preventing society from doing Y. As previously mentioned, there are compelling moral reasons for keeping climate change within reasonable risk limits. If everyone invested their money in the most profitable opportunities or consumed whatever they liked best, it would be impossible to achieve a rapid climate transition [42]. Therefore, although epistemically valid, the expectations of investors and consumers in the luxury industry are not legitimate. However, this is not the case for some people working in the luxury industry, particularly those on low wages or with restricted access to alternative income sources. It is indeed possible for society to implement an ambitious climate transition while ensuring that everyone's basic needs are met, either through work or income support [43,44].

Therefore, on the one hand, there are valid reasons to put an end to high-wealth emissions as soon as possible. On the other hand, some luxury industry stakeholders have legitimate expectations that they will continue to benefit from the production of high-end goods. The government's challenge lies in finding a balance between these competing demands. There are

two non-exclusive strategies for achieving this [35]. The first is to select a policy instrument that does not involve the immediate and/or complete cessation of high-end goods production. The second is to tackle high-wealth emissions head on and, at the same time, compensate those whose legitimate expectations are frustrated by the policy. This article will evaluate luxury-focused mitigation policies based on their ability to fulfil these strategies. The fact that a policy option frustrates the legitimate expectations of some stakeholders without raising any revenue does not mean that this frustration cannot be compensated for by allocating resources from elsewhere. However, I posit that a luxury-focused mitigation policy would be more effective in avoiding the frustration of legitimate expectations if it generated revenue internally and "constrained" these resources [45] to compensate those affected.

1.5 Administrative feasibility

When analysing a policy option, two aspects of feasibility must be considered: political and administrative. Political feasibility refers to the probability that a policy will be approved by the relevant bodies and officially incorporated into the system of rules and laws. It is subject to both hard and soft constraints [46,47]. Hard constraints render a policy option unfeasible due to "logical" or "nomological" restriction [46]. Soft constraints, on the other hand, are economic, institutional and cultural factors that make the adoption of a policy option more or less probable [47]. Unlike hard constraints, soft constraints are malleable, especially over time. For example, a policy proposal for the government at time *t* to distribute more than all the wealth available in the country to a specific social group at time *t* would obviously encounter nomological constraints and would therefore be rejected a priori. However, a proposal for the government to ban all cars from the country immediately would not encounter hard constraints, but rather enormous soft constraints. It would provoke widespread social protest and have dire economic consequences, etc. Therefore, while banning cars is feasible in the strict sense, the probability of it passing through the policy-making process is incredibly low.

The administrative feasibility of a policy proposal refers to an organisation's ability to achieve the desired outcome once the proposal has been approved by the relevant bodies and enacted as law or regulation. This depends on the effort required in terms of personnel, technology, and methodologies, as well as the body's capacity to implement the policy and sanction infringements [48–50]. For example, banning all cars would probably be as politically unfeasible as banning cars with number plates bearing even numbers. However, the latter would certainly be less administratively feasible, as it would require local police to analyse all number plates in order to identify and punish offenders.

Luxury-focused mitigation policies do not face hard constraints and are therefore politically feasible. However, they would encounter significant soft constraints in the form of strong opposition from consumers, producers, and more broadly, everyone involved in related industries. Furthermore, consumers of high-end goods — i.e. multimillionaires — typically exert considerable political influence through media ownership, political party sponsorship, public profile, and access to lobbying services. This influence could be used to oppose luxury-focused mitigation policies [10]. While empirical literature has analysed what can make climate policies more socially acceptable, focusing particularly on compensation mechanisms [51], this has not yet been applied specifically to policies targeting emissions from the ultra-rich. Therefore, this article conservatively assumes that all luxury-focused mitigation policies have a low level of political feasibility, and does not discuss this further. Clearly, the fact that one or more policy options encounter a low level of political feasibility does not render discussion of these options useless. As previously mentioned, the soft constraints are malleable. In the case of luxury-

focused mitigation policies, for instance, these constraints could be overcome by generating sustained political momentum from the ground up. Discussing the normative arguments in favour of these policies so that they become visible to as many people as possible is certainly a step in this direction.

For the above reasons, the comparative analysis of the three policy options will focus solely on administrative feasibility. In particular, the analysis will assess the policies based on how easy they are to implement, taking into consideration the complexity of collecting the required information and the effort involved in sanctioning violations. Since we are assuming that all three luxury-focused mitigation policies have a low level of political feasibility, policies that are more administratively feasible than others are more likely to be feasible in general. This is also because administrative feasibility could affect political feasibility: the easier a policy proposal is to implement, the easier it could be to build political support for its approval, all other things being equal.

1.6 The prevention of carbon leakage

One of the main obstacles to a government implementing luxury-focused mitigation policy is that multimillionaires can easily respond by buying and/or moving their high-end goods in/to countries that have not adopted similar measures. This risks nullifying a country's efforts to tackle high-wealth emissions and creates an international incentive for governments to freeride on such policies [52,53]. The more successful a government is in preventing its resident population from circumventing a luxury-focused mitigation policy, the more effective it will be. This article will evaluate luxury-focused mitigation policies based on the tools they provide governments with to prevent their residents from producing high-wealth emissions abroad.

2. A comparative analysis of luxury-focused mitigation policies

In this section I will use the six criteria elaborated in the previous section to provide a comparative analysis of bans, luxury carbon taxation and progressive carbon taxation as means for effectively discouraging the purchase and/or use of high-end goods.

2.1 Bans

A Ban on high-end goods is a legislative measure by which a government prohibits the purchase and/or use of one or more of these goods from a specified date onwards [54,55]. A ban on high-end goods can be either retrospective or prospective. In theory, fully retrospective bans on high-end goods could be justified on the basis of the ethical arguments outlined so far. However, such bans could easily be instrumentalised in public debate as an attack on private property, setting a dangerous precedent that could backfire on the middle classes, etc. [56,57]. Therefore, the most sensible way to introduce a ban that effectively discourages high-wealth emissions is in two steps. First, at time t, the government could ban the sale of a list of high-end goods from a given date t_1. Then, from a later date t_2, it could prohibit the ownership of a list of high-end goods purchased before t_1. Whether the second list should contain the same or fewer items than the first is also a matter of common sense. For example, it might be reasonable to prohibit from t_2 the possession of private jets purchased before t_1. However, it may be less reasonable to require at t_2 the partial or total demolition of mega-mansions purchased before t_1, given the complexities arising from waste disposal, structural changes to buildings, etc.

The quicker and more effectively luxury-based mitigation measures prevent the ultra-rich from producing high-wealth emissions and encourage behavioural change, the fairer the sharing of the collective carbon budget will be. In the case of bans, this mainly depends on the time difference between t_1 and t_2. This is an issue that will inevitably be subject to political negotiation. We could say that the distance between t_1 and t_2 should be the minimum required to ensure that the ban on high-wealth emissions does not risk triggering a social backlash against tackling high-wealth emissions. If the time gap between t_1 and t_2 is insufficient to effectively discourage high-wealth emissions, the government could consider introducing a luxury carbon tax alongside the ban during the period between t_1 and t_2. For this reason, I argue that the bans score high on emissions justice.

In order to restore expressive justice, a luxury-focused mitigation policy must stigmatise the expressive wrongs that the ultra-rich commit by drawing from the collective carbon budget to satisfy their lavish desires. Banning the sale of high-end goods is a powerful way of doing this. I therefore argue that bans score high on expressive justice. A similar argument applies to social efficiency. The more consumption of high-end goods is reduced, along with the resulting "expenditure cascades", the more efficiently resources are used by society. Banning the sale of high-end goods from t_1 would counteract the "arms race" among multimillionaires to own increasingly ostentatious and carbon-intensive high-end goods. At the same time, banning the ownership and/or use of certain high-end goods from t_2 could correct the positional "damage" caused by their accumulation to date. Indeed, if the ultra-rich were to dispose of many of their high-end goods between t_1 and t_2, this would lower the bar of acceptable consumption for the rich, which would then set a lower bar for the upper-middle class, and so on down the social scale. I therefore argue that bans score high on social efficiency.

Bans could lead to manufacturers of high-end goods suddenly closing entire production lines. This could have an adverse affect on many workers who have based their life plans on the legitimate expectation of continuing to have a career in the luxury industry. Furthermore, bans do not generate revenue that can be distributed to workers as compensation for having their legitimate expectations frustrated. As mentioned previously, a government could introduce a luxury carbon tax alongside a ban between t_1 and t_2. However, the tax base — i.e. high-end goods — would be limited and decline rapidly because of the prospective ban. Consequently, the tax revenues are unlikely to be sufficient to fund full compensation. I therefore argue that bans score low on legitimate expectations.

Bans are relatively easy to implement. They simply come into force when a law is passed, after which it is up to private actors to comply. The control mechanisms are straightforward and do not require excessive bureaucracy. I therefore argue that the bans score high on administrative feasibility. The issue of preventing carbon leakage is more challenging, however. For example, if country C1 introduces a ban on owning of a certain type of high-end good, say superyachts, a citizen of C1 could register their superyacht in country C2 without the authorities of C1 being able to seize the boat or prevent its use. In theory, the authorities in country C1 could collect information on the high-end goods owned by their citizens abroad and impose penalties, such as additional taxes, on those found to own them. However, it would be difficult for any government to justify taxing someone for owning something in another country where that same thing is legal. Moreover, even if this cross-border action were possible from a legal standpoint, it would be difficult to implement and, above all, could easily be obstructed by countries that, in order to attract luxury tourists, guarantee conditions with little transparency about the real

owners of the high-end goods present on their territory [41]. I therefore argue that bans score low in preventing carbon leakage.

2.2 Luxury carbon taxation

Luxury carbon taxes apply to the use and/or ownership of high-end goods. For example, in the case of private jets, luxury carbon taxes may be levied as a surcharge on the purchase of the jet, and/or as an annual ownership tax, and/or as a surcharge on the purchase of jet fuel, etc. [1,7,58,10]. The purpose of luxury carbon taxes is to effectively discourage the purchase of many high-end goods, but not all of them, otherwise they would be better categorized as de facto bans– for instance, the overall impact of a $1 billion luxury carbon tax on the purchase of a private jet would resemble that of a ban more than a luxury carbon tax. Luxury carbon taxes can be modulated in different ways. For the purposes of this analysis, I will consider a luxury carbon tax on the purchase of a high-end good, or on an asset that is instrumental to its use (e.g. fuel), as a consumption tax equal to up to 100% of the good's market price. I will also consider a luxury carbon tax on the ownership of a high-end good as an annual tax of up to 15% of its market price. These two taxes can obviously be combined, and they can be introduced relatively quickly by a government, for example by including them in the annual budget legislation.

Even if luxury carbon taxes were imposed on all high-end goods, high-wealth emissions would not stop altogether, or at least not immediately. There are three main reasons for this [1,59,60]. Firstly, many multimillionaires are so wealthy that they could absorb the price increase caused by luxury carbon taxes without altering their consumption patterns. Secondly, as high-end goods are highly positional, it is reasonable to assume that rendering these goods inaccessible to some of the ultra-rich would make them more exclusive and attractive to those who can still afford them. Thirdly, producers of high-end goods may wish to absorb some of the price increase caused by luxury carbon taxes to ensure that their products continue to have a sufficiently large market. I therefore argue that luxury carbon taxation scores medium on emissions justice.

A similar argument can be made for expressive justice. On the one hand, by targeting high-end goods, luxury carbon taxation explicitly conveys society's disapproval of the emissions that these goods generate. On the other hand, however, the ultra-rich who choose to absorb the cost of these taxes are signalling an even greater level of disregard to everyone else by continuing to produce high-wealth emissions. They are so wealthy that they can afford to continue using the collective carbon budget to satisfy their most extravagant desires, despite strong moral disapproval from society. I therefore argue that luxury carbon taxation scores medium on expressive justice. The issue of social efficiency is more complex. As we have seen, imposing a sufficiently high luxury carbon taxation would create divisions among consumers of high-end goods. Some of the ultra-rich would probably continue to consume such goods, while others would switch to smaller houses, less ostentatious boats and scheduled flights, and so on. Assuming that the consumption choices of the upper-middle classes are primarily driven by those immediately above them, it is reasonable to conclude that the adoption of less conspicuous consumption by the less affluent among the ultra-rich would have repercussions further down the social scale, regardless of the actions of those at the very top. Naturally, all of this would need to be tested and analysed empirically further, but I believe we can cautiously argue that luxury carbon taxation scores medium on social efficiency.

The two main differences between a luxury carbon tax and a ban are that the former does not result in the total collapse of high-end goods production, and that it generates revenue for the government. This money can be used, in whole or in part, to provide economic protection and/or

facilitate the reintegration into the labour market of those workers whose jobs are at risk due to the decline in the production of high-wealth goods. I therefore argue that luxury carbon taxes score medium on the non-frustration of legitimate expectations. From an administrative point of view, luxury carbon taxation is no more significantly complex than a ban, nor does it require a special administrative apparatus. Its statutory incidence can be set at the lowest point in the production chain, i.e. at final sale [61]. It can also be implemented as a complement to existing consumption tax schemes. I therefore argue that luxury carbon taxation scores high on administrative feasibility. Furthermore, luxury carbon taxation also offers a relatively simple and effective solution to the problem of carbon leakage. A government introducing a luxury carbon tax on certain high-end goods could require its residents to declare any high-end goods they own abroad, threatening administrative or criminal penalties for lying or failing to disclose them [1]. The government could then apply a sort of luxury carbon border adjustment mechanism. For example, if individual A, who resides in country C1, owns a high-end good P in country C2, and P is taxed at a lower rate in C2 than it would be in C1, the government of C1 could require A to pay the difference (if any) between the luxury carbon tax levied on P in C2 and the tax levied on P-type goods in C1. I therefore argue that luxury carbon taxation scores medium in preventing carbon leakage.

2.3 Progressive carbon taxation

Progressive carbon taxation is a tax scheme in which the marginal tax rate on carbon emissions increases as individuals move from a lower to a higher emissions bracket [3,11,12]. To effectively discourage high-wealth emissions, the top emissions bracket must approximate the level of emissions that distinguishes consumers of high-end goods from all others, and carry a much higher marginal tax rate than the bracket immediately below it. In a recent operationalisation of this proposal [3], the marginal carbon tax rate is set at zero for individuals who emit less than $1.5tCO_2$ in a given year. This increases to $50 per tonne if emissions are between $1.5tCO_2$ and $3tCO_2$, rising progressively to reach $10,000 per tonne is emissions are between $20tCO_2$ and $50tCO_2$ per year, and $1 million per tonne if emissions are $50tCO_2$ or more. Individual carbon footprints would be calculated using a combination of precise data collection and average estimates. For household emissions, for example, examining the meters would suffice. More or less accurate data on emissions from house construction could be obtained from building permit applications. In many cases, rail and airline companies already provide data on the emissions attributable to individual passengers. Private flights are usually monitored, and the emissions produced can be calculated based on the duration of the flight and the type of aircraft. With cars and boats, however, it is not easy to measure actual consumption, and therefore emissions should be attributed based on factors such as size, engine, and other technical specifications [3].

To assess the effectiveness of progressive carbon taxation in reducing high-wealth emissions, it is necessary to distinguish between different types of high-end goods. Progressive carbon taxation would lead to greater reductions in emissions from private jets and superyachts than luxury carbon taxation would, thus achieving a similar outcome to a ban. In fact, private jets emit an average of 3.6 tCO_2 per flight [62]. Therefore, an individual using a private jet around fourteen times a year for personal reasons might fall into the highest emissions bracket for jet emissions alone. A marginal carbon tax rate of $1 million per tonne of CO_2 applies to this bracket. Even if the owner of a private jet were given the option to split the emissions of a flight between guests for tax purposes, this could potentially place them in a different emissions bracket, which could put them off taking the flight (not to mention that splitting emissions records with guests to avoid

individual taxes might not be considered particularly elegant for a multimillionaire). Therefore, being in the highest emissions bracket due to private jet use would incur much higher costs than paying a percentage tax on the market price of a private jet at the time of purchase and/or annually, as would be the case with luxury carbon taxation – the market price of private jets can range from $2–$3 million for basic models to over $100 million for the largest and most luxurious ones. The same applies even more so to superyachts, which emit thousands of tonnes of CO_2 per year [62]. The cost of using them would therefore be extremely high as a result of progressive carbon taxation.

The situation with mega-mansions is probably slightly different. The purchase cost of a mega-mansion is relatively high compared to the emissions resulting from its use. The purchase cost is affected by luxury carbon taxation, while the emissions resulting from its use are affected by progressive carbon taxation. Therefore, luxury carbon taxation would generally be more effective than progressive carbon taxation in discouraging the purchase of mega-mansions (while the emissions generated by the construction of mega-mansions would be relatively high, this cost could be spread over the building's lifetime). However, progressive carbon taxation would be more effective than a ban on mega-mansions that have already been purchased. As previously mentioned, the feasibility of retroactively banning mega-mansions, or parts of them, is very low due to technical issues relating to material disposal, as well as possible social backlash. Therefore, bans would do little to incentivise people to reduce the size of mega-mansions they already own. Conversely, progressive carbon taxation entails that the emissions produced by living in mega-mansions are included in emissions bracket calculations. This creates an incentive for multimillionaires to reduce their houses' energy consumption, which is obviously linked to size. This incentive applies whether they are already in the highest emissions bracket or at risk of falling into it. A similar incentive could be provided by an annual luxury tax on house ownership. Whether this or the other incentive is stronger should be assessed on a case-by-case basis. Finally, progressive carbon taxation would be less effective than a ban or a luxury carbon tax in discouraging the use of high-emission road vehicles. This is because the emissions produced by the latter are relatively low compared to other high-end goods; therefore, a surcharge on their purchase and/or an ownership tax would be more effective than a tax on their marginal emissions. Taking all these considerations into account, I argue that progressive carbon taxation scores medium on emissions justice.

A twofold consideration is required in the discussion of expressive justice. Above, we posited that progressive carbon taxation is overall as effective as luxury carbon taxation in discouraging high-wealth emissions. However, progressive carbon taxation does not specifically target high-wealth emissions as such and therefore does not convey a direct message of social disapproval towards them. Rather, it simply introduces a progressive system of taxing emissions, the sharp increase in the cost of high-wealth emissions being an indirect consequence. I therefore argue that progressive carbon taxation scores low on expressive justice. It should be noted, however, that a higher score on expressive justice could be achieved with a different policy proposal consisting of introducing only the highest emissions bracket: up to a threshold of 50 tCO_2 per year, an equal-for-all policy (e.g. a flat carbon tax) would apply, and above that threshold, a marginal carbon tax rate of $1 million per tonne of CO_2 would kick in. This would no longer constitute progressive carbon taxation in the strict sense, but would instead act as a tax-based cap on individual emissions. As it would only apply to the wealthy, it would perhaps encounter less social resistance from the less affluent, making it more similar to luxury carbon taxation in this respect. Unlike luxury carbon taxation, however, the tax-based cap would penalise the ultra-rich in proportion to their emissions from high-end goods, rather than simply for buying and/or

owning them. Nonetheless, this comparative analysis does not consider the tax-based cap, as the literature does not sufficiently address its practical aspects. Above all, it must be established whether the potential benefits of the tax-based cap justify its associated administrative complexity and costs compared to luxury carbon taxation or an outright ban.

A twofold consideration also applies to social efficiency. As with luxury carbon taxation, progressive carbon taxation will not result in the ultra-rich reducing their emissions by a total amount. As mentioned above, the ultra-rich are likely to be willing to pay the additional cost of owning a high-emission vehicle or a mega-mansion given the relatively low emissions associated with their use. However, unlike luxury carbon taxation, progressive carbon taxation provides a financial incentive for the rich and the upper middle classes to reduce their emissions because of intermediate emissions brackets. Therefore, while some high-wealth emissions would remain, progressive carbon taxation could mitigate the expenditure cascades that these emissions induce, thereby reducing positional consumption among those below the ultra-rich. I therefore argue that progressive carbon taxation scores medium on social efficiency.

Like luxury carbon taxation, progressive carbon taxation has the dual benefit for workers of not stopping the production of high-end goods altogether and raising significant revenue that can be used to protect jobs at risk. I therefore argue that progressive carbon taxation scores medium on the non-frustration of legitimate expectations. In terms of administrative feasibility, however, progressive carbon taxation faces two main problems. Firstly, this policy incurs relatively high information costs compared to other luxury-focused mitigation policies. It requires the creation of an administrative reporting system in which emissions from diverse sources are added up and constantly updated. These sources include travel; the type and number of cars owned, with specifications such as engine size and model; houses bought and sold; domestic consumption; and emissions from construction. The second problem is that progressive carbon taxation is easy to circumvent. For example, a person could register goods in the name of relatives or friends to ensure that the emissions generated by these goods do not exceed the threshold for the highest tax bracket. Another option is to register high-end goods in companies one controls, or even worse, deliberately create companies to keep one's individual carbon footprint relatively low. Of course, all of this can be avoided through accurate tax controls. However, if we consider the combined cost of information and enforcement, the administrative burden of progressive carbon taxation is significant. I therefore argue that progressive carbon taxation scores low in terms of administrative feasibility.

In theory, progressive carbon taxation could address the problem of carbon leakage, but in practice this would be extremely difficult. Firstly, an integrated system would be required to exchange information between countries. This would include data on consumption recorded by household meters, technical specifications of vehicles on national registers, and air and rail travel within and out of the national territory. On the other hand, countries wishing to attract luxury tourism could offer wealthy consumers tax advantages, such as registering high-end goods with intermediaries or companies not directly linked to them. Therefore, I argue that progressive carbon taxation scores low in terms of preventing carbon leakage.

3. Discussion

This comparative analysis shows that bans achieve the highest overall score. They also achieve the maximum score on three of the four normative criteria. However, this is not sufficient for an outright policy recommendation, as bans score low in terms of preventing the frustration of

legitimate expectations and carbon leakage. While the former issue could be addressed by allocating resources elsewhere to compensate workers if a ban abruptly halts the production of high-end goods, the latter issue is more problematic. If there is no way to prevent multimillionaires from moving high-end goods to another country in response to a ban introduced by a single country, it could prove self-defeating for that government. As mentioned in the introduction, resolving this type of trade-off between different criteria is beyond the scope of this article. I will therefore limit myself here to highlighting the main trade-offs that emerged from the comparative analysis of the three different policy options.

Bans best promote both emissions and expressive justice. Indeed, they lead to the fastest and most effective reduction in high-wealth emissions, as well as the most severe and direct stigmatisation. All three luxury-focused mitigation policies are expected to mitigate expenditure cascades triggered by the ultra-rich's demand for high-end goods, albeit for different reasons. However, bans are more socially efficient because they would strongly curb the ultra-rich's arms race to possess luxury and carbon-intensive goods. In terms of the non-frustration of legitimate expectations, bans perform worse than the two tax policy instruments due to the shock they would impose on the luxury industry, and because they do not raise revenue for earmarking to protect vulnerable workers. In technical terms, both bans and luxury carbon taxation are relatively straightforward to implement at a national level. In contrast, progressive carbon taxation incurs significant information and monitoring costs. Finally, both bans and progressive carbon taxation face the serious problem of carbon leakage, which could call into question the desirability of a country implementing these measures unilaterally. Luxury carbon taxation, on the other hand, offers a promising way to address this issue.

	Emissions justice	Expressive justice	Social efficiency	Non-frustration of legitimate expectations	Administrative feasibility	Carbon leakage prevention
Bans	High	High	High	Low	High	Low
Luxury carbon taxation	Medium	Medium	Medium	Medium	High	Medium
Progressive carbon taxation	Medium	Low	Medium	Medium	Low	Low

Table 1. For each of the three different luxury-focused mitigation policies, it is shown how they score against six different criteria, both normative and non-normative.

Further research

The article proposed a comparative analysis of the three main luxury-focused mitigation policies that have been discussed in the literature. This article marks the initial step towards a comprehensive evaluation of policies designed to address the greenhouse gas emissions of the ultra-rich. However, several issues were not addressed and deserve further research. Firstly, the article provides a general comparison of the three policies, highlighting the main trade-offs in values. It would, however, be important to take the analysis to a more specific, sector-based level. For example, there may be reasons to resolve trade-offs in one way for private jets and in

another way for mega-mansions. Secondly, although the article assumes that all three luxury-focused mitigation policies have a low level of political feasibility, it does not present this information in a scalar view. A more detailed identification of the soft constraints that apply to different luxury-focused mitigation policies would be useful for understanding how to mitigate them. However, such an analysis would require an empirical investigation, which is currently lacking in the literature, as far as I am aware. Thirdly, the article assumes that a country wishing to implement a luxury-focused mitigation policy must do so unilaterally, or almost so. However, more research is needed to determine whether the political conditions exist for a multilateral agreement to reduce high-wealth emissions. Or what might ultimately encourage such an agreement.

Competing Interests:

The authors have declared that no competing interests exist.

Financial Disclosure:

FC has received funding from the European Union's Horizon Europe research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101109449 (PROHIBLUX). The funder had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Acknowledgments

This article was presented at the *Philosophy of Societal Transformations* conference at Utrecht University (NL). I am very grateful to the organisers and participants for their helpful comments.

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